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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/765,220	01/18/2001	Carl Dodge	1391-19200 (2000-IP-00021	7381

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EXAMINER	
PATHAK, SUDHANSHU C	
ART UNIT	**PAPER NUMBER**
2634	2

DATE MAILED: 06/09/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	09/765,220	DODGE, CARL	
	Examiner	Art Unit	
	Sudhanshu C. Pathak	2634	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *January 18th, 2001*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-8* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-8* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *January 18th, 2001* is/are: a)☐ accepted or b)☒ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

1. Claims 1-to-8 are pending in the application.

Drawings

2. Figures 1 & 2 should be designated by a legend such as "Prior Art" since only that which is known is illustrated.

   Correction is required.

Claim Rejections - 35 USC § 103

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

   (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

4. Claims 1-5, are rejected under 35 U.S.C. 103(a) as being unpatentable over Montgomery (5,253,271) in view of Harmuth (Applications of Walsh functions in Communications; IEEE Spectrum; November 1969; Pages 82-91).

Regarding to Claims 1-4, Montgomery discloses a transmitter (Fig. 2, element 10 & Abstract, lines 1-12) comprising a constellation encoder configured to receive a sequence of n-bit data words and configured to convert the sequence of the data into a sequence of m-bit constellation signal point labels (Column 2, lines 7-43 & Column 3, lines 3-24 & Column 4, lines 57-68 & Column 5, lines 1-14 & Column 7, lines 38-68 & Column 8, lines 45-68 & Column 10, lines 5-55 & Fig. 2, elements 18-22 & Fig. 3, element 21 & Fig. 6, element 18, 21 & Fig. 8a-d & Fig. 13 & Claim 1); and a modulator to receive the sequence of signal point labels and configured to

responsively generate at least one amplitude-modulated function, having an amplitude in each symbol interval , determined by a corresponding signal point label in the sequence of signal point labels (Fig. 2, element 22 & Fig. 3, element 28, 30 & Fig. 5, element 74 & Column 2, lines 43-57 & Column 5, lines 15-40 & Claim 1 & Fig. 6 & Fig. 8a-d & Fig. 13 & Column 6, lines 33-68 & Column 7, lines 55-68 & Column 10, lines 5-55). Montgomery also discloses implementing the encoder and the modulator using digital circuitry (Fig. 2 & Fig. 3 & Fig. 6 & Fig. 13 & Column 5, lines 45-60). Montgomery also discloses the multiple amplitude modulated square waves are summed to produce a modulated signal Fig. 3, elements 28-34). However, Montgomery does not specify the modulator to generate an amplitude-modulated bi-valued function determined by a corresponding signal point label in the sequence of signal point labels.

Harmuth discloses orthogonal functions, which are further bi-valued, called Walsh functions (Page 82, left-hand column, lines 1-12, 25-36 & Page 82, right-hand column, lines 1-40 & Fig. 1 & Fig. 2 & Fig. 13). Harmuth further discloses the Walsh functions comprise "odd" and "even" components defined as "sal(i, θ) and "cal(i, θ)" respectively (Page 82, right-hand column, lines 8-15 & Fig. 1). Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention that Harmuth teaches implementing the Walsh functions, to provide the orthogonal signals, instead of sine/cosine functions in communications systems and this can be implemented in the transmitter as described in Montgomery so as to easily implement the modulator using semiconductor technology components, furthermore

the Walsh functions implemented are determined by a corresponding signal point of the constellation, thus providing each point on the constellation a valid combination of the basis functions, wherein the basis functions are Walsh functions, which replace the "sine/cosine" function as described in Montgomery. Furthermore, the odd and even components comprise the first and second amplitude-modulated bi-valued functions.

Regarding to Claim 5, Montgomery discloses a method of data communication comprising receiving a sequence of data words (Fig. 2, element "Input data Txd" & Fig. 6, element 16 & Column 1, lines 1-45); converting the sequence of data words into a sequence of constellation signal point coordinate values, wherein the sequence of sets can be represented as:

$(x_{1k}, y_{1k}, x_{2k}, y_{2k}, \ldots, x_{(d/2)k}, y_{(d/2)k})$, where k=1, 2, ...

wherein k= sequence index; d= dimensionality of constellation

(Column 2, lines 7-43 & Column 3, lines 3-24 & Column 4, lines 57-68 & Column 5, lines 1-14 & Column 7, lines 38-68 & Column 8, lines 45-68 & Column 10, lines 5-55 & Fig. 2, elements 18-22 & Fig. 3, element 21 & Fig. 6, element 18, 21 & Fig. 8a-d & Fig. 13 & Claim 1); and producing a modulated signal "M(t)" that can be represented as:

$M(t) = \Sigma \Sigma (x_{jk}\ cal\ (j, t-kT) + y_{jk}\ sal\ (j-kT))$

(Fig. 3, elements 28-34 & Column 2, lines 7-43 & Column 3, lines 3-24 & Column 4, lines 57-68 & Column 5, lines 1-30 & Column 7, lines 38-68 & Column 8, lines 45-

68). However, Montgomery does not specify implementing the modulator by using the Walsh functions to obtain the modulated signal.

Harmuth discloses orthogonal functions, which are further bi-valued, called Walsh functions (Page 82, left-hand column, lines 1-12, 25-36 & Page 82, right-hand column, lines 1-40 & Fig. 1 & Fig. 2 & Fig. 13). Harmuth further discloses the Walsh functions comprise "odd" and "even" components defined as "sal(i, θ) and "cal(i, θ)" respectively (Page 82, right-hand column, lines 8-15 & Fig. 1). Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention that Harmuth teaches implementing the Walsh functions, to provide the orthogonal signals, instead of sine/cosine functions in communications systems and this can be implemented in the transmitter as described in Montgomery, by replacing the sine/cosine operators with the Walsh function generators, so as to easily implement the modulator using semiconductor technology components, Furthermore, "sal" and "cal" represent the odd and even components of a certain order of the Walsh functions.

5. Claims 6-8, are rejected under 35 U.S.C. 103(a) as being unpatentable over Montgomery (5,253,271) in view of Harmuth (Applications of Walsh functions in Communications; IEEE Spectrum; November 1969; Pages 82-91) in further view of Bremer (5,642,379).

Regarding to Claims 6-8, Montgomery discloses a receiver (Fig. 2 & Column 14, lines 19-60) that comprises an analog-to-digital converter configured to convert a received signal into a sequence of samples, wherein the multiple samples are taken

in each symbol period (Fig. 2, element 40); and multiple circuits configured to manipulate the sign of the sequence of samples in accordance with a function (Fig. 4, element 42). Montgomery further discloses a decision element configured to convert the resulting values into a sequence of signal constellation points (Fig. 2, elements 42-46 & Column 14, lines 20-60) and a constellation decoder configured to convert the sequence of signal constellation points into a sequence of n-bit data words (Fig. 2, element 46). However, Montgomery does not specify the function to be a Walsh function and the circuit further configured to sum each of the resulting values, of the manipulating circuit, over each symbol period.

Harmuth discloses orthogonal functions, which are further bi-valued, called Walsh functions (Page 82, left-hand column, lines 1-12, 25-36 & Page 82, right-hand column, lines 1-40 & Fig. 1 & Fig. 2 & Fig. 13). Harmuth further discloses the Walsh functions comprise "odd" and "even" components defined as "sal(i, θ) and "cal(i, θ)" respectively (Page 82, right-hand column, lines 8-15 & Fig. 1). Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention that Harmuth teaches implementing the Walsh functions, to provide the orthogonal signals, instead of sine/cosine functions, in the circuit configured to manipulate the sign of the sequence of samples, in communications systems and this can be implemented in the receiver as described in Montgomery, by replacing the sine/cosine operators with the Walsh function generators, so as to easily implement the modulator using semiconductor technology components. However, Montgomery

in view of Harmuth does not disclose summing each of the resulting manipulated values over each symbol period.

Bremer discloses a receiver comprising filter elements performing the function for summing the signal manipulated, using the orthogonal signal generator, so as to provide a clean and band limited signal to the equalizer (Fig. 5, elements 505, 506 & Column 5, lines 1-20). Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention that Bremer teaches filtering (integrating) the signal so as to provide a clean signal for a more accurate demodulation, decoding and equalization, and this element can be implemented in the receiver as described in Montgomery in view of Harmuth as part of the demodulation process, thus satisfying the limitations of the claims.

6. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Sudhanshu C. Pathak whose telephone number is (703) 305-0341. The examiner can normally be reached (Monday-Friday from 8:30 AM to 5:30 PM).

   If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Stephen Chin, can be reached at (703) 305-4714.

   Any response to this action should be mailed to:

   - Commissioner of Patents and Trademarks Washington, D.C. 20231

   Or faxed to:

   - (703) 872-9314 (for Technology Center 2600 only)

   Hand-delivered responses should be brought to:

- Crystal Park II, 2121 Crystal Drive, Arlington, VA, Sixth Floor (Receptionist).

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to:

Technology Center 2600 Customer Service Office whose telephone number is (703) 306-0377.

STEPHEN CHIN
SUPERVISORY PATENT EXAMINER
TECHNOLOGY CENTER 2600